

# ENERGY STORAGE SOLUTIONS

FOR RENEWABLE ENERGY HYBRID SYSTEMS / BACKUP POWER



# LEGENDARY QUALITY FOR THE SOLAR INDUSTRY.

As the leading manufacturer of deep-cycle batteries, Trojan Battery Company believes it is possible to make a global shift to energy sources that are environmentally friendly and readily available worldwide.

For nearly 100 years, Trojan Battery has focused its experience and expertise in deep-cycle technology on manufacturing the highest quality, deep-cycle batteries available in the industry.

Trojan Battery's world-class development team continually tests and innovates new products, systems, and applications, establishing Trojan's reputation as the world's #1 deep-cycle battery manufacturer.

Our commitment is to our customer. Trojan Battery ensures that our products are made with the highest quality components and always deliver superior performance, durability and reliability.

Essential to Trojan's overall commitment to product quality is our investment in independent third-party testing, which provides valuable data on product performance while validating Trojan's product reliability and quality. This investment ensures that Trojan delivers the best products available for your application.

#### THE TROJAN ADVANTAGE

- World's leading manufacturer of advanced deep-cycle battery technology
- Worldwide reputation for best return on investment, durability, performance, and quality components
- Outstanding technical and customer service
- Industry leader in health and safety compliance as well as environmental stewardship
- Available in over 120 countries

TECHNOLOGY	SOLAR INDUSTRIAL	SOLAR PREMIUM	SOLAR SIGNATURE	SOLAR AGM	BENEFITS
Smart Carbon™	•	•			Provides improved charge acceptance and faster recharge under PSOC conditions.
Alpha Plus® Paste with T2 Technology	•	•	•	•	Proprietary high-density paste maximizes sustained performance and increases total energy.
DuraGrid™ Technology	•	•		•	Thick grid structure maintains better corrosion resistance.
Trojan Grid Technology			•		Exceptional structural adhesion which enhances current flow and reduces downtime and maintenance costs.
Reinforced Protection Wrap	•				Protects against shedding and ensures electrochemical performance.
Maxguard® XL Separator	•	•			Wide-channel design increases acid flow for optimum battery performance.
Premium AGM Separator				•	Extra thick separators extend the life-cycle.
Maxguard® T2 Separator			•		Optimizes porosity development in active material which sustains battery for longer period of time.
Moss Shield	•	•			Increases battery life by protecting the top of the plates from shorting to the cell strap.
Maximum Flame Arrestors	•	•	•	•	Provides maximum safety by preventing sparks from igniting the hydrogen in the battery cell.
Hydrolink <sup>™</sup> or Single-Point Watering Kit	•	•	•		Precise battery watering is safer, easier and faster for Solar Industrial, Premium and Signature batteries.
Premium Casing	•	•	•	•	Durable Polyon <sup>™</sup> or polypropylene casing protects against damage caused by harsh conditions.

# ENGINEERED AND MANUFACTURED WITH THE RELIABILITY, DURABILITY AND PERFORMANCE OUR CUSTOMERS HAVE COME TO EXPECT.

At Trojan, we are investing at record levels in manufacturing and production improvement projects at our U.S. facilities. Trojan's recent addition of advanced robotics, state-of-the-art cast-on-strap (COS) technology, automated acid fill stations, heat seal and testing equipment ensure the overall quality of our batteries.









# IMPORTANCE OF TESTING LEAD-ACID BATTERIES TO THE IEC 61427 STANDARD

Life expectancy of Photovoltaic batteries based on lead-acid chemistry has been difficult to quantify — until now. The IEC 61427 test provides performance criteria that lead-acid batteries in Partial State of Charge applications like PV should be measured against.

# SOLAR SUPERIOR CYCLING



#### **SOLAR INDUSTRIAL**

3,600 CYCLES @ 50% DOD 610 - 2450 Ah @ 100 Hr







**KEY FEATURES** 

Smart Carbon™ Alpha Plus® Paste with T2 Technology™ DuraGrid™ Technology Moss Shield

Reinforced Protection Wrap Maxquard® XL Separator



#### **SOLAR PREMIUM**

1,900 CYCLES @ 50% DOD 225 - 1255 Ah @ 100 Hr







#### **KEY FEATURES**

Smart Carbon™ Alpha Plus® Paste with T2 Technology™ DuraGrid™ Technology Maxguard® XL Separator Moss Shield



### **SOLAR SIGNATURE**

600 - 1,200 CYCLES @ 50% DOD 95 - 490 Ah @ 100 Hr



#### **KEY FEATURES**

Alpha Plus® Paste with T2 Technology™ Trojan Grid Technology Maxquard® T2 Separator

# THE TROJAN FAMILY YOU KNOW AND TRUST.



#### **SOLAR AGM**

1,700 CYCLES @ 50% DOD 105 - 375 Ah @ 20 Hr





#### **KEY FEATURES**

Alpha Plus<sup>®</sup> Paste with T2 Technology<sup>™</sup> DuraGrid<sup>™</sup> Technology Premium AGM Separator Rugged Construction



#### **SOLAR GEL**

1,000 CYCLES @ 50% DOD 85 - 265 Ah @ 100 Hr



#### **KEY FEATURES**

Non-Spillable Low Self-Discharge No Stratification High Temperature Tolerant Shock and Vibration Resistant

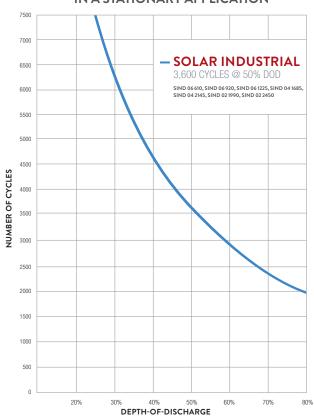


# **SOLAR INDUSTRIAL**

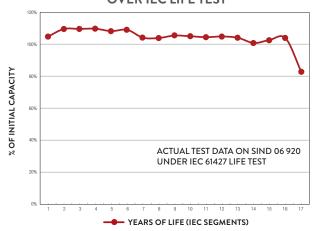
The Solar Industrial Line is engineered specifically to support renewable energy systems with large daily loads where the batteries are cycled regularly. These high amp-hour capacity batteries are ideal for use in large off-grid photovoltaic (PV) systems, off-grid hybrid PV systems, grid-tied PV systems with battery backup, smart grid peak shifting systems and a variety of other applications. The Solar Industrial Line is tested to IEC standards and features advanced battery technologies that deliver reliable power. Trojan's Solar Industrial Line is the perfect combination of performance and function.

♦ FLOODED ♦ 610 - 2450 Ah @ 100 Hr ♦ 17 YEARS LIFE\* ♦ 5-YEAR WARRANTY ♦ EASY MAINTENANCE

## DEPTH OF DISCHARGE VS. CYCLE LIFE IN A STATIONARY APPLICATION



# SUSTAINED CAPACITY OVER IEC LIFE TEST



#### **◆** SMART CARBON™

Increases the electrochemically active surface area which provides improved charge acceptance and faster recharge in applications where the batteries may experience Partial State Of Charge (PSOC) on a regular basis.

#### ◆ ALPHA PLUS® PASTE WITH T2 TECHNOLOGY™

A proprietary, high-density paste formulation precisely engineered to deliver outstanding battery performance.

#### **③** DURAGRID™ TECHNOLOGY

Features a thick grid structure which maintains greater corrosion resistance, effectively increasing the life of the battery.

# REINFORCED PROTECTION WRAP

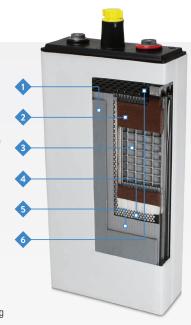
Protects against shedding and assures the electrochemical performance of the battery's active material.

## MAXGUARD® XL SEPARATOR Footuge a wide abancel design that increases

Features a wide-channel design that increases acid flow for optimum battery performance.

#### MOSS SHIELD

Protects the separators from damage. The moss shield increases the battery life by protecting the top of the plates from shorting to the cell strap.



SMART

# **SOLAR PREMIUM**

Renewable Energy applications operate under challenging conditions such as fluctuating or extreme temperatures, remote locations and the intermittent nature of solar and wind power generation. Trojan Battery's Solar Premium Line of flooded deep-cycle batteries is specifically designed and tested to IEC standards to withstand the rigorous conditions of renewable energy applications. Our product strategy is focused on one simple objective — manufacture the highest quality battery available in the industry.



♦ FLOODED ♦ 225 – 1255 Ah @ 100 Hr ♦ 8+ YEARS LIFE\* ♦ 3-YEAR WARRANTY ♦ EASY MAINTENANCE

# 1 2 3 3 3 4 4

SMART

#### **◆** SMART CARBON™

A proprietary formula of carbon additives designed to enhance battery life and performance.

# **♦** ALPHA PLUS® PASTE WITH T2 TECHNOLOGY™

Optimizes porosity development in the active material resulting in sustained battery performance over a longer period of time.

## **3** DURAGRID™ TECHNOLOGY

Specifically designed for the longer life requirements of renewable energy applications.

# ◆ MAXGUARD® XL SEPARATOR

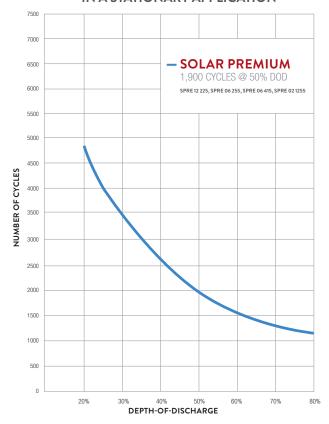
30 percent thicker than our T2 flooded battery separator, and provides even greater resistance to stratification which is typically a mode of failure in batteries used in renewable energy systems.

"TROJAN BATTERY PROVIDED THE DURABLE, LONG
LASTING ENERGY STORAGE REQUIRED FOR THIS
SELF-CONTAINED PV SYSTEM TO WORK PROPERLY
WHILE AVOIDING THE NEED TO USE DIESEL. WITH THEIR
ROBUST DESIGN AND DOUBLE CASING, TROJAN'S SOLAR
BATTERIES SAFELY SHIPPED TO THIS REMOTE LOCATION
AND FIT PERFECTLY IN THE OFF-GRID SYSTEM."

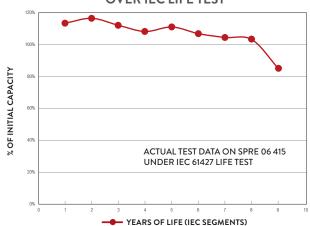
#### DANIEL MEDINA

OWNER AND FOUNDER OF HEMEVA S.A.S.

## DEPTH OF DISCHARGE VS. CYCLE LIFE IN A STATIONARY APPLICATION



## SUSTAINED CAPACITY OVER IEC LIFE TEST



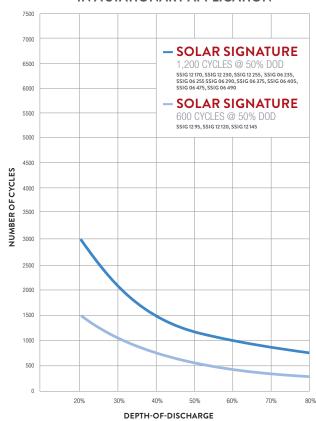


# **SOLAR SIGNATURE**

The Solar Signature Line of deep-cycle flooded batteries is engineered to provide rugged durability and outstanding performance. Trojan's Solar Signature Line is perfectly suited for use in renewable energy systems where lowest life-cycle cost is the key consideration. An all-around power house, the Solar Signature Line features Trojan's historically-proven engineering with T2 Technology, an advanced battery technology for maximum sustained performance, longer life and increased total energy.

♦ FLOODED ♦ 95 - 490 Ah @ 100 Hr ♦ 6 MONTHS TO 1 YEAR WARRANTY ♦ EASY MAINTENANCE

## DEPTH OF DISCHARGE VS. CYCLE LIFE IN A STATIONARY APPLICATION



# ALPHA PLUS® PASTE WITH T2 TECHNOLOGY™ Optimizes porosity development in the

Optimizes porosity development in the active material resulting in sustained battery performance over a longer period of time.

#### TROJAN GRID TECHNOLOGY Specifically designed for the longer life requirements of renewable energy applications.

3 MAXGUARD T2 SEPARATOR
The separator features a multi-rib geometry
which keeps acid channels open longer,
enhancing electrochemical processing while
reducing the risk of stratification. Maxguard's
thick back web provides even greater separator
strength resulting in a more robust battery, with
increased protection against failures caused by
separator degradation.



"HAVING INSTALLED TROJAN BATTERIES OVER 10 YEARS AGO FOR MY OWN SOLAR SYSTEM, THEY CONTINUE TO OUTPERFORM, EXCEEDING MY EXPECTATIONS.

I CHOOSE TROJAN BATTERIES BECAUSE THEY ARE DURABLE AND EASY TO MAINTAIN."

DAVID VERNER ADIRONDACK SOLAR, ALBANY NY

# **SOLAR AGM**

Trojan has incorporated several key engineering features in its Solar AGM batteries for renewable energy, hybrid and backup power applications that require deep-cycling power in a non-spillable battery design. Engineered for best value and worry-free usage, Trojan Solar AGM maintenance-free batteries can be counted on day in and day out as a reliable power source for a wide range of off-grid, grid-tied and unstable grid applications.



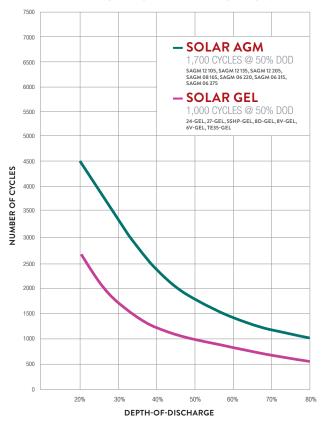
♦ AGM ♦ 105 - 375 Ah @ 20 Hr ♦ 8+ YEARS LIFE\* ♦ 3-YEAR WARRANTY ♦ MAINTENANCE-FREE

# TROJAN'S PROVEN QUALITY AND RELIABILITY IS THE RESULT OF OUR EXTENSIVE ENGINEERING EXPERTISE IN DEEP-CYCLE BATTERY DESIGN. OUR SOLAR AGM BATTERIES FEATURE:

- Premium absorbed glass mat separators for maximum performance
- Optimized paste formula for solar applications
- Flame arrestors for safety
- Rugged Polypropylene case for durability

These combined elements deliver increased total energy output, maximized sustained performance, consistent quality, and enhanced durability.

## DEPTH OF DISCHARGE VS. CYCLE LIFE IN A STATIONARY APPLICATION





# **SOLAR GEL**

Trojan's non-spillable, maintenance-free gel batteries deliver superior energy in demanding renewable energy applications. Engineered for rugged durability, outstanding performance and long battery life, Trojan's deep-cycle gel batteries feature a proprietary gel formulation which provides consistent performance. Its active material effectively adheres to the heavy-duty thick grids supplying concentrated energy to the terminals.

♦ GEL ♦ 85 - 265 Ah @ 100 Hr ♦ 1-YEAR WARRANTY ♦ MAINTENANCE-FREE

# **SOLAR PRODUCT SPECIFICATION GUIDE**

MODEL	VOLTAGE		CAPACIT	Y <sup>A</sup> AMP-HO	OURS (Ah)		ENERGY (kWh) DEFAULT		DIMENSIONS <sup>B</sup> INCHES (mm)			WEIGHT E		INSTALLATION
NAME		10-Hr RATE	20-Hr RATE	48-Hr RATE	72-Hr RATE	100-Hr RATE	100-Hr RATE	TERMINALD	LENGTH	WIDTH	HEIGHT °	LBS. (kg)	HANDLES	ORIENTATION
	SOLAR IN	IDUSTR	IAL LIN	IE – DEI	EP-CY	CLE FLO	ODED BAT	TERIES WI	TH SMART	CARBON <sup>™</sup>	- 3,600 CY	CLES @	50% DOD	
SIND 06 610	6 VOLT	421	472	540	578	610	3.66	14	15.33 (389)	10.22 (260)	24.01 (610)	220 (100)	Molded	Vertical
SIND 06 920	6 VOLT	627	708	813	870	920	5.52	14	22.34 (567)	10.30 (262)	24.01 (610)	315 (143)	Molded	Vertical
SIND 06 1225	6 VOLT	835	942	1083	1159	1225	7.35	14	27.13 (689)	10.44 (265)	24.01 (610)	415 (188)	Molded	Vertical
SIND 04 1685	4 VOLT	1149	1293	1489	1594	1685	6.74	14	22.34 (567)	10.30 (262)	24.01 (610)	367 (167)	Molded	Vertical
SIND 04 2145	4 VOLT	1474	1647	1896	2030	2145	8.58	14	27.22 (691)	10.44 (265)	24.01 (610)	465 (211)	Molded	Vertical
SIND 02 1990	2 VOLT	1393	1547	1771	1889	1990	3.98	14	15.33 (389)	10.22 (260)	24.01 (610)	235 (107)	Molded	Vertical
SIND 02 2450	2 VOLT	1712	1882	2166	2318	2450	4.90	14	17.33 (440)	10.22 (260)	24.01 (610)	278 (125)	Molded	Vertical
	SOLAR	PREMIL	JM LINI	- DEE	P-CYC	LE FLO	DDED BATT	ERIES WIT	H SMART C	CARBON™-	1,900 CYC	LES @ 50	0% DOD	
SPRE 12 225*	12 VOLT	179	204	212	216	225	2.70	6	14.97 (380)	6.91 (176)	14.71 (374)	132 (60)	Braided Rope	Vertical
SPRE 06 255	6 VOLT	211	229	244	249	255	1.53	16	10.30 (262)	7.13 (181)	11.74 (298)	67 (30)	Embedded	Vertical
SPRE 06 415*	6 VOLT	346	377	401	410	415	2.50	5	11.66 (296)	6.94 (176)	17.55 (446)	118 (54)	Braided Rope	Vertical
SPRE 02 1255*	2 VOLT	1039	1130	1203	1232	1255	2.51	5	11.66 (296)	6.94 (176)	17.55 (446)	119 (54)	Braided Rope	Vertical
		SOL	AR SIG	NATUR	E LINE	- DEEP	-CYCLE FLO	OODED B	ATTERIES -	1,200 CYCI	ES @ 50%	DOD		I
SSIG 12 170	12 VOLT	136	153	157	164	170	2.04	2	13.95 (354)	7.13 (181)	10.71 (272)	84 (38)	Braided Rope	Vertical
SSIG 12 230*	12 VOLT	192	209	214	223	230	2.76	6	14.97 (380)	6.91 (176)	14.67 (373)	114 (52)	Braided Rope	Vertical
SSIG 12 255*	12 VOLT	211	229	237	247	255	3.06	6	14.97 (380)	6.91 (176)	14.67 (373)	123 (56)	Braided Rope	Vertical
SSIG 06 235	6 VOLT	196	214	220	228	235	1.42	1	10.30 (262)	7.13 (181)	10.74 (273)	58 (26)	Embedded	Vertical
SSIG 06 255	6 VOLT	211	229	237	247	255	1.53	1	10.30 (262)	7.13 (181)	10.74 (273)	62 (28)	Embedded	Vertical
SSIG 06 290	6 VOLT	243	265	271	281	290	1.74	1	10.30 (262)	7.13 (181)	11.48 (292)	72 (33)	Embedded	Vertical
SSIG 06 375*	6 VOLT	309	336	348	363	375	2.25	6	11.66 (296)	6.94 (176)	14.37 (365)	96 (44)	Braided Rope	Vertical
SSIG 06 405*	6 VOLT	337	366	376	392	405	2.43	6	11.66 (296)	6.94 (176)	14.37 (365)	98 (44)	Braided Rope	Vertical
SSIG 06 475*	6 VOLT	393	428	441	459	475	2.85	5	11.66 (296)	6.94 (176)	17.55 (446)	114 (52)	Braided Rope	Vertical
SSIG 06 490*	6 VOLT	407	443	455	474	490	2.94	5	11.66 (296)	6.94 (176)	17.55 (446)	125 (57)	Braided Rope	Vertical
		SO	LAR SIC	SNATUR	RE LINI	E - DEE	P-CYCLE FL	OODED B	ATTERIES -	600 CYCL	ES @ 50% I	DOD		
SSIG 12 95	12 VOLT	79	87	88	92	95	1.14	7	10.92 (277)	6.62 (168)	9.25 (235)	47 (21)	Molded Plastic	Vertical
SSIG 12 120	12 VOLT	99	107	111	116	120	1.44	9	12.84 (326)	6.60 (168)	9.74 (247)	55 (25)	Molded Plastic	Vertical
SSIG 12 145	12 VOLT	122	132	135	140	145	1.74	9	13.94 (354)	6.75 (171)	10.09 (256)	66 (30)	Braided Rope	Vertical

MODEL NAME	VOLTAGE	CAPACITY A AMP-HOURS (Ah)				ENERGY (kWh)	DEFAULT	DIMENSIONS B INCHES (mm)			WEIGHT E	HANDLES	INSTALLATION	
		10-Hr RATE	20-Hr RATE	48-Hr RATE	72-Hr RATE	100-Hr RATE	20-Hr RATE	TERMINAL	LENGTH	WIDTH	HEIGHT °	LBS. (kg)	HANDLES	ORIENTATION
SOLAR AGM LINE – DEEP-CYCLE AGM BATTERIES – 1,700 CYCLES @ 50% DOD														
SAGM 12 105	12 VOLT	94	105	109	111	113	1.26	15	12.80 (325)	6.81 (173)	9.34 (237)	67 (30)	Molded Plastic	Horizontal and Vertical
SAGM 12 135	12 VOLT	131	135	136	137	137	1.62	15	12.96 (329)	7.06 (179)	10.96 (278)	83 (38)	Embedded	Horizontal and Vertical
SAGM 12 205	12 VOLT	174	205	210	213	216	2.46	15	14.97 (380)	6.94 (176)	14.07 (357)	131 (59)	Braided Rope	Horizontal and Vertical
SAGM 08 165	8 VOLT	145	165	168	171	174	1.32	15	10.30 (262)	7.06 (179)	10.73 (273)	70 (32)	Embedded	Horizontal and Vertical
SAGM 06 220	6 VOLT	190	220	228	231	235	1.32	15	10.30 (262)	7.06 (179)	10.73 (273)	68 (31)	Embedded	Horizontal and Vertical
SAGM 06 315	6 VOLT	278	315	326	331	335	1.89	15	11.66 (296)	6.94 (176)	13.99 (355)	95 (43)	Braided Rope	Horizontal and Vertical
SAGM 06 375	6 VOLT	329	375	389	394	400	2.25	15	11.66 (296)	6.94 (176)	16.31 (414)	114 (52)	Braided Rope	Horizontal and Vertical

	MODEL	VOLTAGE	CAPA	CITY FAMP-HOUR	IS (Ah)	ENERGY (kWh)	DEFAULT	DIMI	WEIGHT E		
SIZE			5-Hr RATE	20-Hr RATE	100-Hr RATE	100-Hr RATE	TERMINAL	LENGTH	WIDTH	HEIGHT <sup>C</sup>	LBS. (kg)
			so	LAR DEEP-C	YCLE GEL B	ATTERIES -	1,000 CYCL	ES @ 50% DO	D		
24	24-GEL	12 VOLT	66	77	85	1.02	6	10.92 (277)	6.61 (168)	9.26 (235)	52 (24)
27	27-GEL	12 VOLT	76	91	100	1.20	7	12.73 (323)	6.38 (162)	9.26 (235)	62 (28)
DIN	5SHP-GEL	12 VOLT	110	125	137	1.64	8	13.58 (345)	6.75 (172)	11.01 (280)	85 (39)
8D	8D-GEL	12 VOLT	188	225	265	3.18	5	20.69 (526)	10.95 (278)	10.82 (275)	168 (76)
GC8	8V-GEL	8 VOLT	114	140	160	1.28	6	10.31 (262)	7.13 (181)	10.88 (276)	70 (32)
GC2	6V-GEL	6 VOLT	154	189	198	1.19	6	10.25 (260)	7.08 (180)	10.82 (275)	68 (31)
DIN	TE35-GEL	6 VOLT	180	210	220	1.32	8	9.64 (245)	7.51 (191)	10.65 (271)	69 (31)



- \*Polyon™ Case
- A. The amount of amp-hours (Ah) a battery can deliver when discharged at a constant rate at 86°F (30°C) and
- a maintain of any-involveying a detail year details when the standards at a constant rate at or Floor maintain a voltage above 1.75 Well. Capacities are based on peak performance. Be detail to the standard of the peak performance. Be detail to the standard of the peak performance. Be detailed to the standard of the s
- D. Terminal images are representative only.
   Weights may vary
- Weights may vary.

  The amount of amp-hours (Ah) GEL batteries can deliver when discharged at a constant rate at 80°F (27°C) and maintain a voltage above 1.75 Wcell. Capacities are based on peak performance.

Trojan's battery testing procedures adhere to both BCI and IEC test standards.

#### **TERMINAL TYPE**



1 - ELPT Embedded Low Profile



2 - EHPT Embedded High Profile



5 - LT L-Terminal



6 - DT Automotive Post & Stud



7 - UT Universal



8 - AP Automotive Post





9 - WNT Wingnut Industrial



14 - IND



15 - M6/M8 16 - SLT 6mm/8mm Insert Small L-Terminal

**CONFIGURE YOUR RENEWABLE ENERGY SYSTEM WITH TROJAN BATTERIES** USING THE ONLINE RENEWABLE ENERGY BATTERY SIZING CALCULATOR

www.batterysizingcalculator.com

# LEADING THE CHARGE YESTERDAY, TODAY, AND TOMORROW.

You don't become the world's leading manufacturer of deep-cycle batteries by following others or being satisfied with the status quo. At Trojan, we have a long-established reputation for leadership, innovation, and a commitment to unsurpassed quality in every product we design and manufacture.

- Trojan made a name for itself in the golf car battery industry starting in 1952. Today we are a leader in deep-cycle markets with applications for mobile elevated work platforms, transportation, renewable energy, floor machines, golf, marine, and recreational vehicles.
- We believe in the power of research and development and dedicate significant resources to bringing advanced battery technologies to market.
- Quality is at the heart of everything we do, and every battery we design and manufacture is subjected to the most rigorous industry testing procedures.

#### **ENVIRONMENTAL STEWARDSHIP**

We are proactive supporters of environmental sustainability. Trojan's environmental stewardship focuses on clean energy initiatives and recycling programs.

 Trojan batteries are 99% recyclable.\* The container plastic, battery lead and electrolyte from old deep-cycle flooded, AGM, and Gel batteries can be recycled to produce new deep-cycle batteries.

Your Local Trojan Battery Representative:











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